

## Description

# IN-LINE FABRIC LABELING PRINTING SYSTEM AND ASSOCIATED METHOD OF USE

### CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This patent application claims priority to U.S. Provisional Patent Application Serial No.60/481,457 filed October 1, 2003.

### BACKGROUND OF INVENTION

[0002] Currently, when licensees or subsuppliers need product labels made of fabric, they make a request to the supplier who produces the labels in large batches. These large batches must be scheduled for printing and then finally shipped to the licensee or subsupplier. Finally, the labels are then attached to the products. A nonlimiting example includes the manufacturing of finished mattress labels in large quantities, which are then, upon request, sent to the licensee. The licensee then sews the labels onto the mat-

tresses. The production of large quantities of product labels is very time consuming, costly and provides very little flexibility. It is not cost-effective for the supplier to print the product labels in anything but large quantities since there are set-up costs involved for each printing production run. Therefore, most of the product labels may stay on a shelf for a long period of time. In some instances, the labels eventually become damaged or outdated and have to be thrown away. Moreover, the licensee or subsupplier must pay for storage of the product labels before they can be put into production. These labels must be protected from theft and damage with associated insurance expenses. Also, special order products and experimental products will create significant problems. They require coordination with the supplier's label production facility with time delays due to the scheduling conflicts with pre-existing orders for product labels. The supplier will require a minimum quantity so that if the marketing test for the experimental product is unsuccessful, a significant amount of product labels will have to be discarded. A small special order will intrinsically result in the destruction of numerous product labels.

[0003] Also, most product labels have general information that

appears on a wide variety of products and specific product information that only specific customers, e.g., sub-suppliers, franchisees, need to utilize since they are only selling those particular models under the general product line. For example, with mattress labels, there are label imprint backgrounds that typically includes manufacturer's trademarks and other general information that can be applied to a number of specific mattress models. In addition, there is specific information that can only be used on one particular model of mattress.

[0004] In the description of flowcharts, the functional explanation marked with numerals in angle brackets, <nnn>, will refer to the flowchart blocks bearing that number. Referring now to FIG. 3, the prior art method of obtaining product labels using fabric is generally indicated by numeral 2. The first step in the process is for the user, e.g., customer, to recognize a need for fabric product labels <10>. The second step is a query as to whether there is a need for a significant quantity of labels, e.g., one hundred (100) <12>. If the response to this query is negative, the process is over <14>. If the quantity is over the predetermined minimum, the next step is for the customer to place the order <16>. The labels are then printed on fab-

ric stock <18>. The labels are then sent to the customer and sewn into the respective products <20>. This is the end of the process <22>. A major drawback to this process is that a predetermined quantity, e.g., one hundred (100) has to be printed to be cost-effective. These labels had to be stored at a significant cost and could become damaged or obsolete before ever being used. This printing is typically performed on large-scale printing presses, e.g., Heidelberg presses, with all of the associated set-up, operational and maintenance costs associated therewith. This conventional printing operation is generally indicated by numeral 500 in FIG. 19.

[0005] One prior attempt to overcome some of these problems was the use of an ink jet printer to print the specific information on the product label by the customers, e.g., sub-suppliers, franchisees, after the general information has been printed elsewhere by the supplier. There are numerous deficiencies associated with the use of ink jet printers. The first is that the ink used with ink jet printing is water-soluble and will bleed upon contact with fabric from a label. Upon drying, the printed ink will easily smear upon physical interaction, e.g., rubbing. An example of this is shown by the mattress label provided in FIG. 1. Moreover,

the resolution for ink jet printing is relatively poor. An example of this is shown by the mattress label provided in FIG. 2 with written material under the EASY CARE™ trademark, as indicated by numeral 3. Moreover, the ink utilized in ink jet printing can fade as well as run under bright lights.

[0006] Ink jet printing on fabric product labels is disclosed in U.S. Patent Application No. 2003/0118795 that was published on July 26, 2003. This published U.S. patent application recites: "Also, while ink jet printing is the preferred embodiment because the label stock adsorbs much of the ink, thereby providing greater crock resistance, laser printing of the label could be used for articles where very high crock resistance is not needed." (Paragraph 0031, Lines 6–8). Therefore, this published patent application specifically teaches away from the use of laser jet printing for mattress labels since this published patent application was specifically directed to the printing of mattress labels and only claimed and described ink jet printing due to this crocking issue. Moreover, this published patent application only discloses the use of an ink jet receptive coating, which is markedly different than laser jet receptive coating or copier receptive coating, which is collectively known as

"toner receptive coating."

[0007] The present invention is directed to overcoming one or more of the problems set forth above.

## **SUMMARY OF INVENTION**

[0008] In one aspect of this invention, a fabric label for a mattress is disclosed. This includes a fabric label, having a top side and a bottom side, wherein at least the top side of the fabric label is conventionally printed with a printing press with general information that is applicable to a plurality of mattress products and wherein the fabric label includes a region that is printed by laser jet printing with specific information that is directed to a single mattress product without any ink jet printing.

[0009] In another aspect of this invention, a fabric label for a product is disclosed. This includes a fabric label, having a top side and a bottom side, wherein at least the top side of the fabric label is conventionally printed with a printing press with general information that is applicable to a plurality of products and a toner jet receptive coating is located on at least a portion of the top of the conventionally printed top side of the fabric label, wherein at least a portion of the toner receptive coating is printed with laser jet printing with specific product information, without any ink

jet printing, to reduce smearing and improve print resolution without a presence of an ink jet receptive coating.

[0010] In yet another aspect of this invention, a process for creating a label for a product utilizing a computer system is disclosed. The process includes selecting information for a fabric label, having a top side and a bottom side, from a computer database wherein at least the top side of the fabric label includes general product information that is applicable to a plurality of products, selecting specific product information that is directed to a single product from the database that can be utilized with the selected fabric label, loading the selected fabric label into a laser jet printer, wherein the selected fabric label has been printed by a printing press with the previously selected general product information that is applicable to a plurality of products and at least a portion of the top side of the selected fabric label includes a toner receptive coating, and printing the specific product information that is directed to a single product onto at least a portion of the toner receptive coating for the top side of the fabric label with the laser jet printer.

[0011] In still another aspect of this invention, a process for creating a fabric label for a mattress utilizing a computer

system is disclosed. The process includes selecting information for a mattress fabric label, having a top side and a bottom side, from a computer database wherein at least the top side of the mattress fabric label includes general information that is applicable to a plurality of mattresses, selecting specific mattress information that is directed to a single mattress from the database that can be utilized with the selected mattress fabric label, loading the selected mattress fabric label into a laser jet printer, wherein the selected mattress fabric label has been printed by a printing press with the previously selected general information that is applicable to a plurality of mattresses, and printing the specific information that is directed to a single mattress onto at least a portion of the top side of the mattress fabric label with the laser jet printer.

[0012] In another aspect of this invention, a computer-readable medium containing a data structure for creating a label for a product utilizing a computer system is disclosed. The computer-readable medium includes a first plurality of electronic files with each file having general product information that is applicable to a plurality of products and each electronic file of the first plurality of electronic files replicates the general product information that is conven-



tionally printed with a printing press on at least one fabric label, and a second plurality of electronic files with each file directed to specific product information and each electronic file of the second plurality of electronic files replicates the specific product information that is laser jet printed on the at least one fabric label having a toner receptive coating.

[0013] In yet another aspect of this invention, a process in a computer system for displaying and printing a product label is disclosed. The process includes displaying a plurality of fabric labels having general product information that is applicable to a plurality of products on at least one electronic display, selecting one fabric label, having a top side and a bottom side, from the plurality of previously displayed fabric labels, displaying a plurality of specific product information that is directed to a single product for the selected fabric label on the at least one electronic display, loading a fabric label into a laser jet printer, wherein the fabric label has been printed by a printing press with the previously selected general product information that is applicable to a plurality of products on the top side and at least a portion of the top side of the selected fabric label has a toner receptive coating, and

printing the specific product information that is directed to a single product onto at least a portion of the toner receptive coating for the selected fabric label with the laser jet printer.

[0014] In another aspect of this invention, a process in a computer system for remotely displaying and printing a product label is disclosed. The process includes accessing a first plurality of electronic files through a global computer network, at a first location, with each electronic file having general product information that is applicable to a plurality of products that is capable of being conventionally printed on a fabric label with a printing press at a second location, accessing a second plurality of electronic files through a global computer network, at the first location, with each file directed to specific product information, loading a fabric label, having a top side and a bottom side, into a laser jet printer at the first location, wherein the fabric label has been printed by a printing press with the previously selected general product information that is applicable to a plurality of products and at least a portion of the top side selected fabric label has a toner receptive coating, and printing the specific product information that is directed to a single product onto at least a portion of

the toner receptive coating for the selected fabric label with the laser jet printer, at the first location.

[0015] These are merely some of the innumerable aspects of the present invention and should not be deemed an all-inclusive listing of the innumerable aspects associated with the present invention. These and other aspects will become apparent to those skilled in the art in light of the following disclosure and accompanying drawings.

#### **BRIEF DESCRIPTION OF DRAWINGS**

[0016] For a better understanding of the present invention, reference may be made to the accompanying drawings in which:

[0017] FIG. 1 is a perspective view of a prior art fabric product label, e.g., mattress label, illustrating ink jet printing and the problem of smearing;

[0018] FIG. 2 is a perspective view of a prior art fabric product label, e.g., mattress label, illustrating ink jet printing and the problem of poor resolution;

[0019] FIG. 3 is a flowchart of the prior art process of printing large batches of fabric product labels using conventional printing technology, e.g., Heidelberg printing presses;

[0020] FIGS. 4, 4A and 4B are a flowchart of the process for printing product information on previously imprinted fab-

ric product labels in accordance with the present invention;

[0021] FIG. 5 is an exemplary screen display (graphical user interface) for providing access, e.g., a log-in and password, to a computer system of the present invention;

[0022] FIG. 6 is an exemplary screen display (graphical user interface) for providing a main home page with links to all main functions in accordance with the present invention;

[0023] FIG. 7 is an exemplary screen display (graphical user interface) for viewing and editing account information for a person or entity that has access to the fabric label computerized laser jet printing system in accordance with the present invention;

[0024] FIGS. 8, 8A, 8B and 8C are an exemplary screen display (graphical user interface) for viewing illustrative, but non-limiting, imprinted fabric product labels available in the system with the general information that applies to a plurality of specific products printed thereon in accordance with the present invention;

[0025] FIGS. 9, 9A, 9B, 9C and 9D are an exemplary screen display (graphical user interface) for viewing a first illustrative, but nonlimiting, listing all of the specific product information files available for a one particular imprinted

fabric product label, shown in FIG. 8B, in accordance with the present invention;

[0026] FIG. 10 is the graphical information for one specific product available for laser jet printing that was selected from the first illustrative listing shown in FIGS. 9, 9A, 9B, 9C and 9D in accordance with the present invention;

[0027] FIG. 11 is an exemplary screen display (graphical user interface) for viewing a second illustrative, but nonlimiting, listing all of the specific product information files available for another particular imprinted fabric product label, shown in FIG. 8, in accordance with the present invention;

[0028] FIG. 12 is the graphical information for one specific product available for laser jet printing that was selected from the first illustrative listing shown in FIG. 11 in accordance with the present invention;

[0029] FIG. 13 is an exemplary screen display (graphical user interface) for adding and editing subaccounts which restrict access for each customer, e.g., licensee or franchisee, to particular specific product information files; in accordance with the present invention;

[0030] FIG. 14 is the graphical specific product information for viewing specific product information files and directing the user to another exemplary screen display (graphical

user interface), i.e., FIG. 15, to ascertain which customers have access to that particular and specific product information file in accordance with the present invention;

[0031] FIG. 15 is another exemplary screen display (graphical user interface) to ascertain which customers have access to particular and specific product information files for laser jet printing of product labels in accordance with the present invention;

[0032] FIG. 16 is a side elevational schematic view of a fabric product label having a resilient coating on the bottom side (second side) and a toner receptive coating on at least a portion of the top side (first side) of the fabric product label in accordance with the present invention;

[0033] FIG. 17 is a perspective view of an illustrative, but nonlimiting, fabric product label, e.g., mattress label, as also shown in FIG. 8B and having general information that is applicable to a plurality of products but has not been laser jet printed and has no specific product information in accordance with the present invention;

[0034] FIG. 18 is a perspective view of an illustrative, but nonlimiting, fabric product label, e.g., mattress label, as shown in FIG. 17 with the addition of specific product information, as shown in FIG. 10, that has been laser jet printed

thereon in accordance with the present invention; and

[0035] FIG. 19 is a general schematic diagram of the inline labeling system in accordance with the present invention.

#### **DETAILED DESCRIPTION**

[0036] In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the invention. However, it will be understood by those skilled in the art that the present invention may be practiced without these specific details. In other instances, well-known methods, procedures and components have not been described in detail so as to obscure the present invention. For example, the invention can be applied to virtually any type of product that utilized printed fabric. Although the preferred application involves the printing of a label for a mattress, a wide variety of fabric label printing applications can benefit from this Invention.

[0037] The preferred method of communication for this Invention is through a global computer network, e.g., Internet. However, there are numerous mechanisms for electronic communication that might suffice for this present invention. The database referred to in this Application can be associated with a single processor or a whole series of

processors. In the description of flowcharts, the functional explanation marked with numerals in angle brackets, <nnn>, will refer to the flowchart blocks bearing that number.

[0038] Referring now to the drawings, and initially to FIGS. 4, 4A and 4B, the flowchart of the present invention is generally indicated by numeral 80. The first step is for the customer to ascertain whether or not fabric labels for products are needed <100>. If the answer to this query is negative, then the process will not proceed <101>. If the answer to this query is positive, the next step is to determine if the quantity of fabric labels is less than a predetermined amount, e.g., one hundred (100), or if this is a custom batch of products or special order of products <102>. If the answer to this query is negative, the large scale printing of the fabric labels takes place at the factory in accordance with the process detailed above in FIG. 3 <104>. If the response to this query is positive, then the customer will utilize imprinted fabric labels that are currently available that do not provide specific product information or indicia <106>. These fabric labels are typically created at a first location, e.g., factory, and then sent to the customer. An example of an imprinted fabric label that does



not have specific product information or indicia is generally indicted by numeral 300 on FIG. 17.

[0039] For conventional printing, due to the significant cost of set-up, large batches of product labels must be printed to be cost effective. A label includes the general product information that appears on a wide variety of products. In addition, there is specific product information that only specific customers, e.g., subsuppliers, franchisees, need to utilize since they are only selling those particular models under the general product line. For example, with mattress labels, there are label imprint backgrounds that typically includes manufacturer's trademarks and other general information that can be applied to a number of specific mattress models as indicated by numeral 300 in FIG. 17. In addition, there is specific information as indicated by numeral 301 in FIG. 18, which can only be used on one particular model of mattress. There is a significant need to allow the customer, e.g., subsuppliers, franchisees, to print the specific information on fabric labels that already have the general information conventionally printed thereon.

[0040] Referring now to FIG. 16, preferably there will be a laser jet receptive coating or copier receptive coating, which are

collectively referred to throughout the present patent application as "toner receptive coating." Toner receptive coating 304 is located on the first or top side of the imprinted fabric label 300. Also, preferably there is a resilient coating, e.g., rubber, 302 on the bottom side or back side of the imprinted fabric label 300.

[0041] There is a marked difference between toner receptive coatings and ink jet receptive coatings. The toner used in laser jets is a fine black powder that is melted and fuses with the fabric in the imprinted fabric label 300. Copiers and laser printers utilize toners that contain various formulations of carbon black, a black, amorphous carbon pigment produced by the thermal decomposition of natural hydrocarbons. Carbon black may also be known as furnace black, acetylene black or thermal black. The toner receptive coating 304 is preferred to prevent smearing. There does not appear to be any issue regarding crocking of the imprinted fabric label 300 when utilizing laser printing and the previously described deficiencies associated with ink jet printing are overcome. There are a number of suppliers that can provide laser jet receptive coatings. Illustrative, but nonlimiting, examples include: Middlesex Research Mfg., Co., Inc. having a place of business

at 27 Apsley Street, P.O. Box 444, Hudson, Massachusetts 01749; Rayven Inc. having a place of business at 431 Griggs Street N, St. Paul, Minnesota 55104; and Precision Coatings, Inc., having a place of business at 8120 Goldie Street, Walled Lake, Minnesota 48390. A wide variety of fabrics can suffice for the imprinted fabric label 300 with the preferred fabric for mattresses being polyester fabric that is preferably, but not necessarily, woven polyester fabric. Preferably, the fabric label is previously dyed a single solid color prior to the conventional printing. The optimal single solid color is white.

[0042] Referring again to FIG. 4, after the customer determines that he or she will utilize imprinted fabric labels that are currently available that do not provide specific product indicia, then the next step is to log into a global computer network, e.g., internet, to access the system associated with the present invention <108>. Referring now to FIG. 5, this takes the customer to the graphical user interface screen that is generally indicated by numeral 200. There is an input for login/e-mail indicated by numeral 202 and an input for a password indicated by numeral 204. There is a graphical user interface pushbutton that the customer then clicks-on to enter the inputted information into the

system 206. There is a link 210 to contact or communicate with the system and a log-out function 212.

[0043] Referring now to FIG. 6, the main home page of the system of the present invention is generally indicated by numeral 211. There is a first function 214 that allows the customer to view and edit account information 214. This directs the customer to the graphical user interface screen for viewing and updating account information that is generally indicated by numeral 230, as shown in FIG. 7. This includes: an input for a login or e-mail address 232; an input for a password 234; an input for a password verification 236; an input for a contact name 238; an input for the name of an organization 240; an input for a telephone number 242; an input for a facsimile number 244; an input for a first address line 246; an input for a second address line 248; an input for a city 250; a drop-down input for a state 252; and an input for a zip code 254. There is a graphical user pushbutton 256 that allows the customer to edit the account information. Finally, there is a link 258 that allows the customer to return to the home page of FIG. 6.

[0044] Referring again to FIG. 6, the second function 216 allows the customer to view all of the fabric label imprint back-

grounds that typically includes manufacturer's trademarks and other general information that can be applied to a plurality of products but excludes the specific product information, which is also indicated by process step <110> as shown in FIG. 4A. Upon activation of this second function 216, the customer is directed to the graphical user interface screen shown on FIGS. 8, 8A, 8B, and 8C that is generally indicated by numeral 260. Each of the illustrative, but nonlimiting, examples of fabric label imprint backgrounds are indicated by numerals 262, 264, 266, 268, 270, 272, 274, 276, 278 and 280. Underneath each of the fabric label imprint backgrounds is a hyperlink that directs the customer to the selection of product specific information that is available for laser printing. In this specific, but nonlimiting example, fabric label imprint backgrounds 262, 264, 266, 268, 270, 272, 274, 276, 278 and 280 have corresponding hyperlink numerals 263, 265, 267, 269, 271, 273, 275, 277, 279 and 281, respectively.

[0045] The next step in the process is that the customer will determine if the desired fabric label imprint background is available <112>. If the desired fabric label imprint background is not available, the process stops <114> and if it

is available, the customer can review all the product information that can be printed on the selected desired fabric label imprint background <116>. A determination can then be made if the specific product information is available <118>. If the desired product information is not available, the process is stopped <120>. If the desired product information is available, the specific information that will be printed on the desired fabric label imprint background can be reviewed <122>, as shown in FIG. 4B.

[0046] For example, the specific product information 278, as shown on FIG. 8B, is also shown on FIG. 17. By clicking on the hyperlink 279, the customer is directed to the graphical user interface screen that is generally indicated by numeral 280 in FIGS. 9, 9A, 9B, 9C and 9D. There are preferably, but not necessarily, numerous links to files that provide specific product information that can be reviewed. One specific link is indicated by numeral 282 in FIG. 9B. Upon clicking this hyperlink, the customer is directed to the specific product information shown in FIG. 10 and indicated by numeral 284. FIG. 18 shows not only the fabric imprint background shown in FIG. 17 but with the addition of this specific product information 301, from FIG. 10, printed thereon to create the finished fabric product

label. An illustrative, but nonlimiting example, of a type of electronic filing containing the specific product information is a formatted document file. The preferred type of formatted document file is in a Portable Document Format file, i.e., PDF, file.

[0047] Another example is by clicking on the hyperlink 275, as shown in FIG. 8B, the customer is directed to the graphical user interface screen that is generally indicated by numeral 290 in FIG. 11. There are preferably, but not necessarily, numerous links to files that provide specific product information that can be reviewed. One specific link is indicated by numeral 292. Upon clicking this hyperlink, the customer is directed to the specific product information shown in FIG. 12 and indicated by numeral 294.

[0048] This process involves the customer picking the correct specific product information that comports with the selected specific product information <124>. The customer then loads the appropriate number of pre-printed fabric labels from inventory into a laser jet printer <126> and prints the desired number of fabric labels with the specific product information <128>. The final step is attaching the fabric label to the product <130>. In the specific example of mattresses, this can include sewing, adhesives,

and so forth. In the preferred embodiment, the labels are printed with the general product information at a first location and then laser jet printed at each customer's specific second location with the specific product information with each customer, e.g., subsuppliers, franchisees, and so forth, only having access to specific product information for a selected number of particular products.

[0049] Another aspect of the present invention is the ability to restrict customers, e.g., licensees and franchisees, to specific fabric label imprint backgrounds and limit the specific product information for each fabric label imprint background. Referring back to FIG. 6, the customer can access the function for creating subaccounts indicated by numeral 218. This directs the customer to the graphical user interface screen for adding and editing subaccount information that is generally indicated by numeral 530, as shown in FIG. 13. This includes: an input for a login or e-mail address 532; an input for a password 534; an input for a password verification 536; an input for a contact name 538; an input for the name of an organization 540; an input for a telephone number 542; an input for a facsimile number 544; an input for a first address line 546; an input for a second address line 548; an input for a city



550; a drop-down input for a state 552; and an input for a zip code 554. There is a graphical user pushbutton 556 that allows the customer to add or edit the subaccount information. There is also a listing of all active subaccounts that is generally indicated by numeral 560. Under this listing 560 is a first example of customer 562 with a link to an edit function 564 and a link to delete that first customer's subaccount 566. The customer information is on a graphical user interface screen that is identical to that shown by numeral 530 on FIG. 13 only with information specific to that particular customer. There is also a second and third examples of customers 568 and 574, respectively. The illustrative second and third customers each have their own link to an edit function 570, 576 and link to delete the customer's subaccount 572, 578, respectively. As before, there is a link 258 that allows the customer to return to the home page of FIG. 6.

[0050] Referring again to FIG. 6, there is a function to manage access to the product specific information for each subaccount 220. By accessing this feature, the customer is directed to a graphical user interface screen that is generally indicated by numeral 580 on FIG. 14. There is a drop-down input 584 that lists all of the product specific infor-

mation in the system. There is a graphical user input pushbutton 586 that allows the customer to view this file and a graphical user input pushbutton 588 that directs the user to a listing of all customers that have access to that specific product information file as indicated by the graphical user interface screen 590 shown on FIG. 15. The listing is indicated by numeral 592 and there is a graphical user interface pushbutton 594 that will update the listing of specific individuals or entities that have access to a specific product information file in the system.

[0051] Referring now to FIG. 19, the overall electronic inline labeling system is generally indicated by numeral 400. The main system server is generally indicated by numeral 410 and preferably, but not necessarily, stores a first plurality of electronic files with each file having general product information that is applicable to a plurality of products and a second plurality of electronic files with each file directed to specific product information that is directed to a specific product. This main system server 410 can include virtually any type of processor. Access to the main server 410 is through a global computer network, e.g., Internet, 412. There is a first customer's processor 414, second customer's processor 418 and a third customer's proces-

sor 422. Although only three customers are illustrated, virtually any number of customers can utilize the system with the only limitation being the computer resources available. Each processor can be a single processor or a whole series of processors. Preferably processors 414, 418 and 422 are each a personal computer, however, a wide variety of electronic computers or electronic controllers will suffice. Each of the processors 414, 418 and 422 are connected to an electronic display 416, 420 and 424, respectively. The preferred electronic display is a liquid crystal display, however, any electronic display will suffice such as plasma, cathode ray tube, and so forth. The electronic displays can display both the general product information that is applicable to a plurality of products and the specific product information directed to a specific product. Each of the processors 414, 418 and 422 are also connected to a laser jet printer 417, 421 and 423, respectively. Virtually all types of laser jet printers will suffice for this application and is only limited by the ability to print on fabric labels. Also, photocopying machines that utilize toner, as previously described, that can receive and print data can also be utilized with the present invention.

[0052] Although the preferred embodiment of the present inven-

tion and the method of using the same has been described in the foregoing specification with considerable details, it is to be understood that modifications may be made to the invention which do not exceed the scope of the appended claims and modified forms of the present invention done by others skilled in the art to which the invention pertains will be considered infringements of this invention when those modified forms fall within the claimed scope of this invention.